

REMARKS/ARGUMENTS

Claims 1, 14-15 and 26 have been amended and claim 28 has been cancelled without prejudice or disclaimer of subject matter. Claims 29-30 have been newly added. Support for the amendments can be found in the originally filed specification and in the claims:

- Claims 1 and 30: page 13, lines 10-18; page 16, lines 1-7; and page 22, lines 2-9;
- Claim 14: page 16, last paragraph; support for claim 1; page 18, last paragraph;
- Claim 15: page 18, first full paragraph;
- Claim 26: the claim as previously presented; and
- Claim 29: the Examples - see Table 1.

No new matter has been added.

Applicant's representative thanks Examiner Bernshteyn for the helpful and courteous discussion held on 19 October 2010. The Examiner agreed that *Kim* does not anticipate the present claims because the 1,2-glycol bond content of the *Kim* PVA ("Poval 205") is outside the claimed range; thus, the 35 USC § 102(a) rejection in view of *Kim* is improper. The remaining issues and rejections are discussed below.

Related art rejections

1. The 35 U.S.C. §103(a) rejections: 1) of Claims 1-3, 5 and 13 as obvious over "Poly(vinyl alcohol) Stabilization of Acrylic Emulsion Polymers Using the Miniemulsion Approach" *Macromolecules*, 2003; 36 (15), p. 5573-5579 ("*Kim*"); 2) of claims 25 and 27 in view of *Kim*; 3) claim 4 in view of *Kim*; and 4) claims 26 and 28 in view of *Kim*, are each respectfully traversed.

Kim discloses polymerization of n-butyl acrylate (nBA) and methylmethacrylate (MMA) in the presence of Poval 205 (as a dispersant). *See* the "Procedures" paragraphs on page 5575, second column. Poval 205 has a 1,2-glycol bond content of 1.6 mol%, which is outside the range as claimed ("--from 1.9 mol% to 4.0 mol% of a 1,2-glycol bond--"—claim 1). There is no disclosure or suggestion in *Kim* of 1) other PVAs having different 1,2-glycol bond amounts, and/or 2) altering the 1,2-glycol bond content in Poval 205. Accordingly, *Kim* contains no disclosure or suggestion of PVAs that comprise "from 1.9 mol% to 4.0 mol% of a 1,2-glycol bond" of claim 1. In regard to ranges, a *prima facie* case of obviousness exists when claimed ranges "overlap or lie inside ranges disclosed by the prior art".¹ The 1,2-glycol bond content of Poval 205 (1.6 mol%), does not overlap or lie inside the claimed range of "from 1.9 mol% to 4.0 mol%" (claim 1).

Further, there is no reason to optimize the value in *Kim*, because, to be optimized, a "particular parameter must first be recognized as a result-effective variable."² There is no disclosure or suggestion in *Kim* that the 1,2-glycol bond content is "a variable which achieves a recognized result."³ There is no disclosure or suggestion in *Kim* of changing the 1,2-glycol bond content of a PVA, because *Kim* discloses one PVA (Poval 205) and contains no disclosure that changing such 1,2-glycol bond content would have any recognizable result on the emulsions. In view of the foregoing, no *prima facie* case of obviousness exists against the present claims in view of *Kim*.

Last, a PVA having "at least 1.9 mol % of 1,2-glycol bond...improves the stability in emulsion polymerization to give the resin emulsion in the invention."⁴ Polymerization stability is defined in the specification as follows:

The emulsion is filtered through a 60-mesh stainless steel sieve (ASTM standard sieve). The filtration residue on the sieve is

¹ MPEP § 2144.05(I.).

² *Id.* at § 2144.05(II.) (B.).

³ *Id.*

⁴ Page 12, first full paragraph of the specification.

collected, and its weight is measured. The residue per kg of the emulsion (solid content) is shown in Table 1.⁵

The emulsions of examples 11 and 12 of the present application each have PVAs having a claimed amount of 1,2-glycol bond content, and the emulsions of these examples each have low polymerization residue of 0.05 and 0.07 g, respectively. With exception of Comparative Example 9, the comparative examples all had higher polymerization residues: on at least the order of 0.1 g. Comparative Example 9 had a low factor a value of 0.2. *See* Tables 1 and 2 of the present application. There is no disclosure or suggestion in *Kim* that the claimed 1,2-glycol bond content would increase polymerization stability. Accordingly, Applicant has shown the criticality of the 1,2-glycol bond content in the PVA as claimed.

For the reasons given above, the claims are distinguished from *Kim*. Withdrawal of the rejection is respectfully requested.

2. The 35 USC § 103(a) rejection of claims 14-24 in view of *Kim* and JP 2002-308939 ("JP '939") is respectfully traversed.

The teachings of the cited references are divergent. As discussed above, *Kim* discloses copolymerization of nBA and MMA. No other monomers are disclosed or suggested for polymerization in addition to these two. JP '939 discloses the copolymerization of ethylene and vinyl acetate (which are not acrylic monomers), where, in "this invention, ethylene and vinyl acetate are mainly used as a monomer."⁶ Additional monomers can be added (*e.g.* butyl acrylate), but such monomer(s) is/are present "in the range which does not spoil the purpose of this invention."⁷ In other words, the additional monomers are used in minor amounts. If nBA and MMA, for example, were also copolymerized in JP '939, they would be present in minor amounts, unlike in *Kim*. Thus, the cited references, individually or

⁵ Page 30, "(2) Polymerization Stability" of the specification.

⁶ JP '939 at paragraph [0010].

⁷ *Id.* at paragraph [0012].

combined, do not disclose or suggest the claimed emulsions having "--a polymer comprising at least one type of reacted monomer units selected from the group consisting of an acrylate monomer unit and a methacrylate monomer unit and, optionally, a further copolymerizable monomer unit, present in said polymer in an amount of at most 20% by weight relative to the weight of all monomer units--" (claim 1). The two references relate to different copolymerizations and the disclosures of the cited references do not overlap or suggest the presently claimed emulsions.

Secondly, *Kim* discloses a thermal radical-initiated copolymerization while JP '939 relates to redox initiated copolymerization. Table 1 of *Kim* discloses that ammonium persulfate (APS) is present in the emulsion (co)polymerization system, where this compound is a known radical initiator for polymerization. See the attached Wiki sheet for APS. There is no disclosure of any reducing agents in *Kim*, and there is no disclosure or suggestion of using a different mechanism (such as redox) for initiating (co)polymerization. On the other hand, JP '939 discloses redox initiation where "the redox system polymerization initiator which consists of hydrogen peroxide, tartaric acid and/or its metal salt" is used.⁸ An iron compound is present in the JP '939 redox initiated copolymerizations for purposes of controlling the polymerization.⁹ Accordingly, the Office's proposed modification of adding an iron compound to *Kim* would switch the polymerization initiating in *Kim* from radical to redox, where there is no teaching or suggestion in *Kim* that redox initiating is suitable. As a result, the Office's proposed modification "would change the principle of operation of the prior art invention being modified."¹⁰ In this case, "the teachings of the references are not sufficient to render the claims *prima facie* obvious."¹¹

⁸ JP '939 at paragraph [0013].

⁹ See *id.* at paragraph [0017].

¹⁰ MPEP § 2143.01(VI.).

¹¹ *Id.*

Last, JP '939 discloses that the concentration of peroxide "needs to be 0.01 to 0.2 weight section to the total monomer used."¹² When the amount exceeds 0.2 weight percent, "control of a polymerization reaction becomes difficult in exceeding 0.2 weight section..."¹³ In a preferred embodiment, the "peroxide is present in an amount of from 0.25 to 2 wt%, relative to the weight of the monomers" (claim 15). Accordingly, JP '939 teaches away from this range because weight percents of greater than 0.2 renders the JP '939 polymerizations uncontrollable. As noted above, there is no *prima facie* case of obviousness against the claims, because the range as claimed and the range disclosed in the cited reference(s) do not overlap or fall within each other.

In view of the foregoing, the teachings of the cited references are divergent and there is no disclosure or suggestion of, especially, the range of peroxide as claimed. Thus, the claims are fully distinguished from the cited references.

Withdrawal of the rejection is respectfully requested.

Other matters

1. The 35 USC § 112, first paragraph rejection of claim 28 has been obviated by cancellation of this claim. Withdrawal of the rejection is respectfully requested.
2. The 35 USC § 112, second paragraph rejection of claim 1-27 and 28 is obviated by amendment to claim 1 and obviated by cancellation of claim 28. Claim 1 has been amended to include upper limits of the tensile strength and the 1,2-glycol bond content.

Withdrawal of the rejection is respectfully requested.

¹² JP '939 at paragraph [0014].

¹³ *Id.*

Conclusion

Applicants respectfully submit that the above-identified application is in condition for allowance. Notification thereof is requested.

Respectfully submitted,

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